



A STUDY ON CURRENTLY AVAILABLE AERIAL FOREST FIRE FIGHTING ASSETS

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Executive Summary of the Final Report

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1. MAIN OBJECTIVES OF THE PROJECT

- Mapping the available aerial firefighting assets in the following Member States: Croatia, Cyprus, France, Greece, Italy, Portugal and Spain.
- Providing an overview of globally available aerial assets in the short-term (2018-2020), medium-term (2021-2023), and long-term (2024-2033).
- Analyse the possible models and corresponding costs of operating a fleet of aircraft and/or helicopters specialised in aerial wildfire suppression (i.e. purchase, lease).

2. KEY FINDINGS

There are over 500 operational aerial firefighting assets in the MS during high season, with majority of helicopters; the most used aircraft are Viking Canadair models

All the analysed MS share the riskiest forest fire seasons in summer (June-September). Numerousness and simultaneous fires in high season are difficult to be dealt with by MS and also, to support the neighboring countries during this time. The number of firefighting assets deployed in high season, is on average 2.4 times higher than during moderate season and about 5.5 times higher than in low season.

- There were 512 operational aerial assets identified in the MS in the season 2017 or 2018: 160 firefighting aircraft (amphibious and non-amphibious), 341 firefighting helicopters plus 11 coordination aircraft. Among these, 107 aircraft/ helicopters are used for extended attacks and 389 for initial attacks (5 for both cases).
- The extended attack aircraft model that is available the most (39 assets altogether) and in the highest number of countries is the Viking Canadair CL 415 (in HR, FR, GR, and IT). The 25 helicopters for extended attacks (Russian Helicopters Ka-32) are used in CYP, PT, ES and GR. Other extended attack models of aircraft are limited to 15 Viking Canadair CL 215 (in GR, PT, ES), 14 Viking Canadair CL 215-T (in ES) and 2 Bombardier Dash 8 Q400 operated in France.
- Besides lack of enough assets during the high season, there were other important challenges identified during the study: different operational procedures between the receiving and international aid fleet that often make the international help not the most effective; no common methodology related to decision about deployment of the aerial assets for firefighting; low situation awareness about crises in progress; timing constraints in responding to the numerous (afternoon) requests, as well as overall, ineffective air-ground communication and communication for supporting fire suppression operations on the ground.

Availability of optimal assets is limited, particularly in the short-term

The market assessment performed in the study mapped the different aircraft available in the market (i.e. amphibious and non-amphibious aircraft, helicopters), more than 30 aircraft models in total. The **prioritisation of the aerial assets followed the technical criteria** (presence of certification, level of feasibility of operation

in the EU, speed, range, modernisation, water productivity) and **availability related criteria** (availability of the asset itself, presence in the fleet of MS, availability of pilots and maintenance personnel, availability of spare parts).

Although on the technical standpoint **amphibious planes** (and in particular Canadair models) are the most convenient choice, their **availability** over the next few years is **extremely limited**, leading to the necessity to identify alternative solutions in particular for the short term (2018-2020).

With these respect, **medium-heavy helicopters** suitable for **extended attacks** are a **solid option**, in particular if the selection of air bases and the choice of operation will follow a “regional” approach, with specific assets generally operating in a specific region within the EU. If this is not the case, several types of converted land planes are available and should be considered.

Nine additional heavy amphibious aircraft are required to bridge the current firefighting capacity gap of the Mediterranean countries

Estimating the capacity gap of firefighting assets for each Member State by only assessing the annual burnt areas resulting from fires and the number of aerial assets available proved to be overly simplistic and not representative. The link between the number of assets available and the efficiency in firefighting is not so evident. Therefore, the **approach for the gap analysis focused on the requests of firefighting aerial support made by MS to the Commission and registered in the CECIS database**. Particularly, the interest was to assess the critical season of 2017, which has proven to be the most critical both in number of fires and areas burnt. In the fire season of 2017, the most critical period was between 12/08/2017 and 15/08/2017, when 7 requests (i.e. from Greece and Portugal) for additional firefighting assets could not be answered.

Based on the historic data, it is possible to assume that in case aerial assets could have been deployed, a total area of 28,348 ha could have been protected by the 7 aircraft (Canadair CL415 considered as benchmark), resulting on an average gap area of approximately 4,000 ha per aircraft. The overall suggestion is, that the **rescEU fleet should consist of 9 aircraft (CL415 equivalent)**, in order to be able to respond to the current gap and one additional aircraft would be required by 2033.

The selection of the air base locations should consider two main aspects: (1) the **familiarity of the host State with the aircraft model** and (2) the **geographical coverage of fire danger areas** based on the range of the aircraft. Based on these criteria, France (Nîmes), Greece (Elefsina) and Spain (Torrejon) could be potential hosts due to their geographical location and familiarity with the helicopter models prioritised. On the longer term, Italy (Ciampino) could become one of the hosts of the amphibious aircraft as soon as they become available. Ciampino already hosts similar models and its central location allows the coverage of the entire area, from Portugal to Cyprus. It is important to mention that the location of the air bases will also depend on additional elements, including technical and political discussions.

Leased helicopters are the best option in the short-term while heavy amphibious aircraft should be purchased as soon as they become available

Based on the gap analysis and on the technical assessment of the different aircraft models, the optimum rescEU fleet is proposed as follows:

- In the **short-term** (2018-2020) airplanes are affected by the low availability of dedicated models for firefighting with high degree of modernization (e.g. CL 515). Specific **helicopter models** for extended attacks (H215 and H225 and Ka-32), would be the best option, representing good productivity with decent range, and are available for wet lease.
- In the **medium-term**, both the CL 415 and the CL 415 EAF will become available and they should progressively replace helicopters. It is suggested to acquire them for wet lease as a bridge towards the CL 515. The latter should be the selected option for the long-term (for purchase), since it doesn't share the modernization issues of the CL415 (avionics) and CL 415 EAF (frame).
- In the **long-term**, the CL 515 should progressively replace all the other models to achieve the optimal fleet composition. By that time, it will also be possible to assess the development of international projects such as the US-2 by Shin Maywa and the performance they can demonstrate.

The investment on rescEU fleet represents is highly beneficial to society

- The total rescEU investment between 2019 and 2033 is estimated in €837 million. In the short-term a total budget of approximately €108 million is estimated. During this period, the budget is allocated for the leasing contracts and no purchase of aircraft is foreseen. The purchase of the rescEU fleet (i.e. Canadairs CL 515) is expected to take place between 2023 and 2025. The total investment cost for rescEU is approximately €247 million, which represent approximately a third of the total cost.
- The financial assessment indicates that for **helicopters**, due to its flexible use outside the fire season, **wet lease contracts were the most cost-efficient options**, as on average their prices are approximately 34% lower than the purchasing option for the same period. For **aeroplanes**, although available for most models, wet lease options had considerably higher costs in the longer- term in comparison to **the purchasing option**, on average more than 27% higher for the analysis period.
- The annual **socio-economic benefits** generated by investment in rescEU (i.e. mainly due to the reduction of impact of forest fires on businesses, productivity, infrastructures and housing) surpass the annual costs already from the first year of analysis, having a very positive result. **The total discounted investment¹ and operating costs for the analysis period is approximately €740 million, while the benefits amount to €2,267 million, more than €177 million per year on average.** These results indicate that for each €1 invested in the rescEU fleet more than €3 are expected in return to the society.
- The total estimated **Economic Net Present Value (ENPV)**, so the difference between the discounted total social benefits and costs, is estimated in **€1,527 million**.

¹ Social discount rate (SDR) = 1.67% per year

Private provider is the best rescEU service provision option in the short-term but Joint Undertaking would be more beneficial in the medium- to long-term

Four service provision options were assessed with technical, legal and economic criteria in short- and medium- to long-term timeframes: **Option 1 - Member States NEUs, Option 2 - Private provider, Option 3A - Public entity, a new inter-governmental organization under public law and Option 3B - Joint undertaking under private law.**

The overall Multi-Criteria Analysis for the short-term period (2018-2020) proved that:

- **The most advantageous Option in the short-term is Option 2: Private Provider**, thanks to its flexibility (ensuring early availability of the service and assets), as well as capacity to ensure common training and unified procedures for the crew and the operation of the fleet. This has a positive impact both on effectiveness and safety.
- **Option 1 Member States NEUs** is a less preferred Option due to the absence of common administrative procedures and operational standards, which change between MS. The assets and competence of the crew would not be standardized, which affect safety & security. Also, challenges with availability of assets and their timely delivery are expected.
- **The Options 3A and 3B would not be feasible in short-term due to their more complicated setting up arrangements.** The economic assessment proves also that an additional year waiting for rescEU operations represent a reduction in the benefits of approximately €45 million in comparison to Options 1 and 2.

The overall Multi-Criteria Analysis in medium- to long-term (2021-2033) proved that:

- **The Option 3B Joint Undertaking would be recommended to implement in the medium- to long-term period but Option 2 Private Provider could be also still considered as an alternative.** Option 3B, once implemented, would be autonomous, could ensure an efficient and cost-effective services and resources. On the other hand, the flexibility of private provider and least complexity needed for setting up the Option 2, should be also considered. However, private provider loses scores in legal assessment due to the difficulty for the EC to exercise a continuous and wide control on the private provider company.

3. CONCLUSIONS

The overall conclusion is that the financial investment necessary for setting up and operating the rescEU fleet is compensated by the socio-economic benefits generated to the society by the reduction of the impact of wildfires. **For each €1 invested in the rescEU fleet more than €3 are expected in return to the society.** The **Economic Net Present Value (ENPV)** in the analysed period (2018-2033) is positive and amounts to **€1,527 million.**

The rescEU fleet should be composed of 9 aircraft (CL415 equivalent) to be able to respond to the current gap. In short-term period, taking into consideration availability, the helicopter models for extended attacks (H215 and H225 and Ka-32) should be used in wet-lease option, being progressively replaced by purchased fixed-wing aircraft, Canadair models to start with.

The most advantageous Option for the **operation of the rescEU fleet in the short-term is the Private Provider**, whereas for **medium- and long- term**, the creation of a **Joint Undertaking** is recommended to be implemented, although private provider remains an interesting alternative to be considered.



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